



# Quick Start Guide

**Commissioning and Verification Procedures for the  
Automated Roller Shade System at  
The New York Times Headquarters, New York, New York**

**Lawrence Berkeley National Laboratory  
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**Notice**

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## Summary

This quick start guide summarizes the steps required to verify the performance of a newly installed automated roller shade system. The automated roller shade system at The New York Times Headquarters has been designed to control direct sun and window glare while admitting daylight and permitting view out. Procedures in this guide focus on verifying that the glare control aspect of this commercially-available system works prior to building occupancy. A high dynamic range luminance measurement tool, developed for this project, is used to verify that the average window luminance is within acceptable limits. The commissioning agent (CxA) and The New York Times will use these procedures during the commissioning phase of the building to verify that the automated control system is operating as intended.

For a detailed description of these procedures and how to use the shade cart tools, refer to the main commissioning manual:

E.S. Lee, R.D. Clear, G.J. Ward, L.L. Fernandes. 2007.  
Commissioning and Verification Procedures for the  
Automated Roller Shade System at  
The New York Times Headquarters, New York, New York  
Lawrence Berkeley National Laboratory, Berkeley, CA  
[http://windows.lbl.gov/comm\\_perf/newyorktimes.htm](http://windows.lbl.gov/comm_perf/newyorktimes.htm)



# 1. Consult commissioning schedule

For a detailed description of the automated roller shade system installed in The New York Times Headquarters, consult the main commissioning (Cx) manual (see Summary for reference).

The verification procedures described in this Quick Start Guide focus on verifying the **glare control mode** of the automated roller shade system.

The **direct sun control mode** can be checked and documented using procedures documented in Steps 10-12. Other problems such as improper shade motor assignments or groupings, shade height misalignment, problems with the touch screen user interface, etc. can be recorded using the same procedures used to document failure of the direct sun control mode. These checks can be done quickly by walking the floor or can be conducted in parallel while verifying the glare control mode with the shade cart.

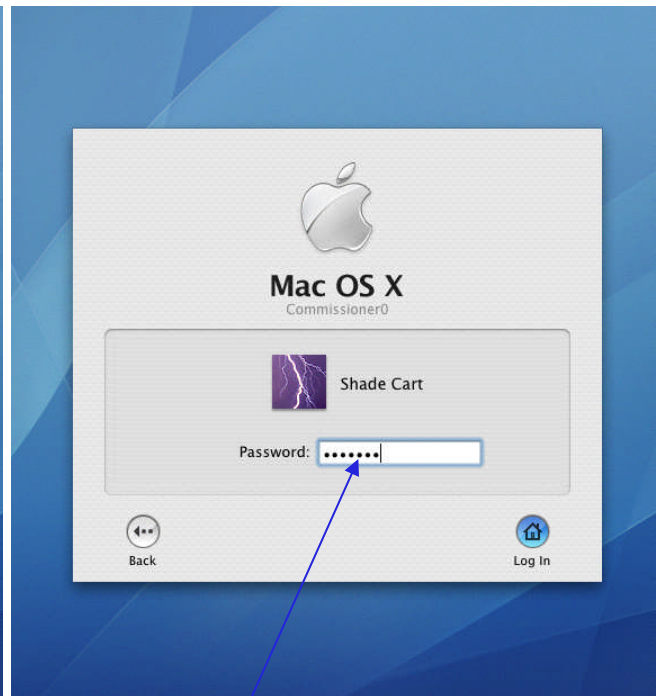
## Schedule:

The glare measurements will be taken in sequence at particular locations and at given times, as defined in the commissioning schedule. Create the schedule a day in advance using the procedures described in Section 2 of the main Cx manual. Adjust the commissioning schedule if the weather changes.

## 2. Start computer



Turn computer on,  
then log in as Shade  
Cart

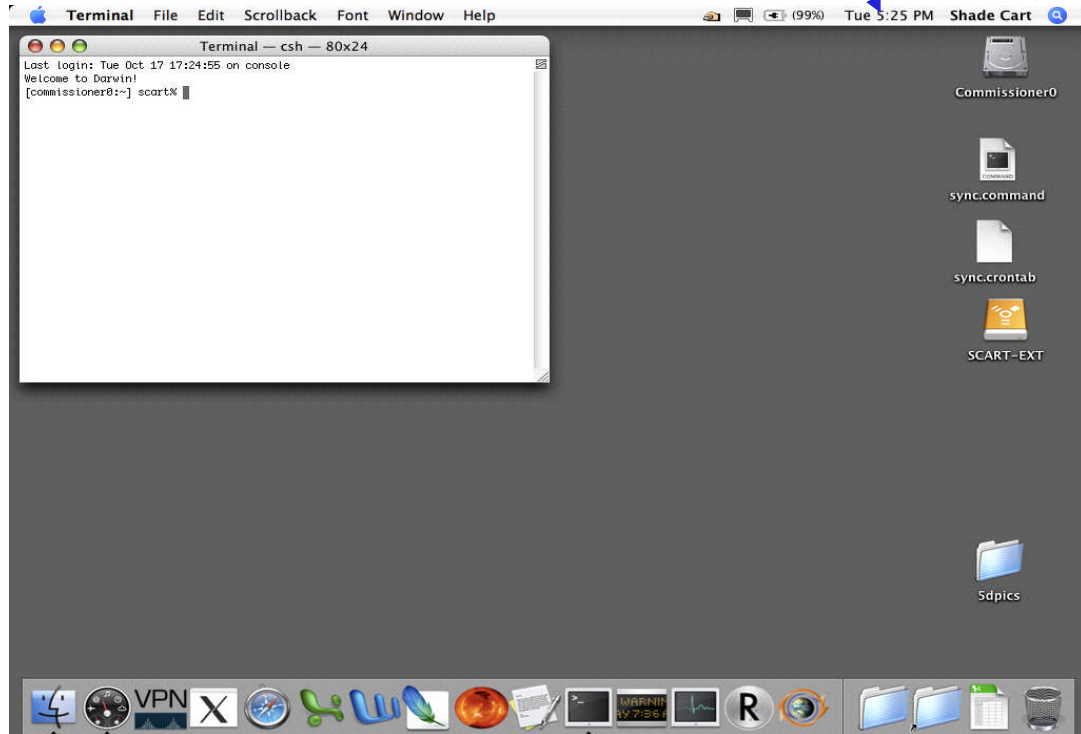


Input password

Use only **"Shade Cart"** login name. **Do not log on as a different user.** Using any other login will cause the image capture program to no longer work.

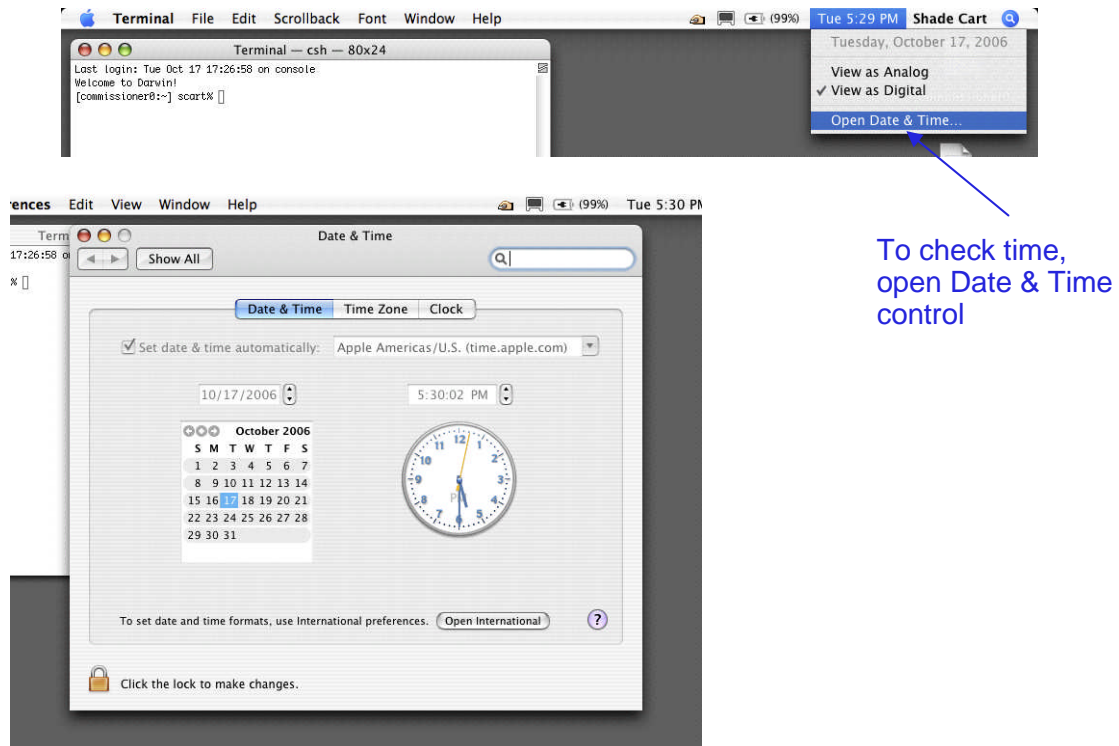
### 3. Check the clock

Check time



- The shade cart's laptop **must** have the same time as the shade supervisory control computer.
- The supervisory control computer's clock should agree with actual local time to within one minute.
- Check the time and synchronize regularly, as often as once per day depending on how the shade supervisory control system is set up to access time.
- Make sure the time zone is set for New York City.

## 4. Correct the clock



- Cart computer's time should not differ by more than one minute from the supervisory control computer's clock. If the difference is more than one minute, contact NYT (for the administrator's login and password) to reset the time prior to performing any tests.
- Both the shade cart's computer and the supervisory control's computer should be set to local time, observing daylight savings time.
- Shutdown Cart computer at this time prior to transporting the cart to the measurement location.



## 5. Prepare the cameras



Make sure round dial is set to "C"



Lens should be set to manual focus



Use this port to connect camera to computer

### HDR Camera:

Prepare the camera prior to moving cart to test location. The high dynamic range (HDR) Canon camera must be configured as follows:

- Confirm round dial on camera top is set to "C". Do not press any other control on the camera. If the C mode gets inadvertently reprogrammed, consult the manual on configuring the manual (M) mode on the camera and use the M mode instead.
- Confirm lens is set to Manual focus (switch on lens set to "M" or "MF", depending on lens model).
- Turn Camera on. Check battery level. If battery level is low, the automated capture may not work because the camera will frequently go to "sleep", forcing you to abort the shade verification program and in some cases restart the shade cart computer.

Clean the camera if necessary.

Do not touch the glass of the lens with anything except lens tissue (sold in camera stores). It should be done very gently, to avoid leaving marks or damaging the anti-reflection coating. Should dirt not come off this way, the lens should be cleaned by a professional.

### Regular Camera:

Check the battery level and time stamp on the portable regular digital camera. This camera should have the same date and time as the shade cart computer.

## 6. Check cart inventory prior to transport



The shade commissioning cart transports the following equipment:

- Digital camera with fisheye lens and tripod mount on an extendable arm
- Digital camera with regular lens for site documentation (not shown)
- Laptop computer (with power cord to uninterruptible power supply shown above)
- Electronic or regular measuring tape
- Document holder
- Backup rechargeable batteries for the computer and camera

The following paper documents should accompany the shade cart when taking measurements. They can also be referenced from the laptop computer.

- 11x17 inch furniture plans showing measurement locations\*
- 11x17 inch MechoShade System (MSS) control diagrams\*
- Schedule of when to take measurements (from Section 2 of manual)

\* These are also available electronically in folder:  
scart/nytimes documents/c Measurement point descriptions

## 7. Transport the cart then set up the camera

Bring all equipment needed for verification activities. Transport cart with computer and camera stowed safely in carrying cases.



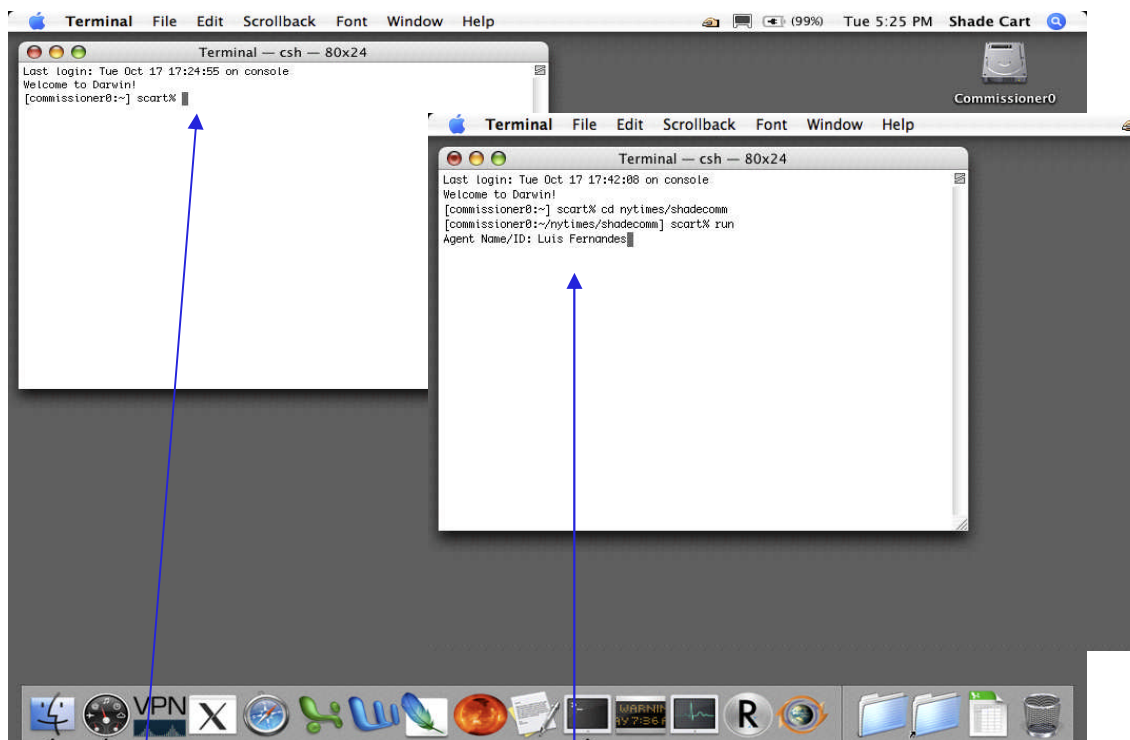
- Place camera on tripod mount being careful not to strip the threads on the camera. Use mounting plate, then take camera in and out by releasing the quick-release latch and pulling out camera+mounting plate.
- Slide bubble mount into top flash port of camera.
- Adjust height so that the center of the lens is at 4 ft ( $\pm$  0.5 inches) above the finished floor.
- Level the camera using the bubble mount on top of camera (pitch and yaw).
- Using connector cable, connect camera to laptop by attaching cable to USB port on laptop and port labeled "Digital" on the side of the camera (this port is reached by lifting one of the rubber flaps). Be careful when removing cable from side of camera – **once this port is damaged, the camera is useless since it can no longer be remotely controlled by the computer.**

## 8. Start the shade commissioning (Cx) software

Restart the computer and log in as Shade Cart user (see step 2).

Launch the Terminal window (see “a” below).

If the Terminal window is not visible, you can open the Terminal application by clicking on the corresponding icon in the lower right of the dock. If dock isn't visible, it will appear when you move the cursor so that it hits the bottom of the screen. Or double-click on the Terminal icon in the Utilities folder, which is inside the Applications folder on the hard drive called “Commissioner 0”.



a) Double-click on Terminal window icon

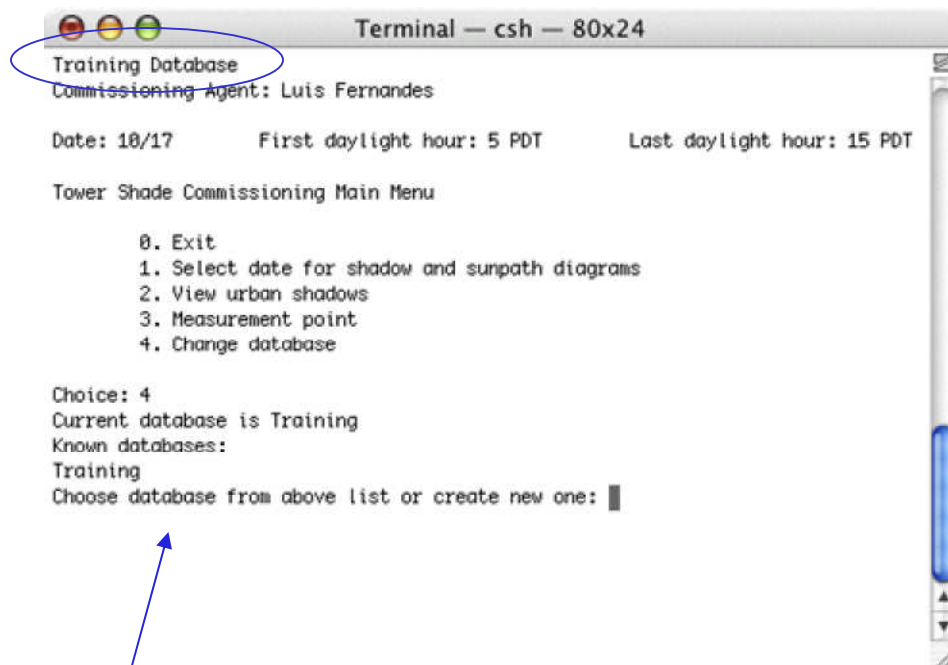
- . b) Key-in (type): `cd nytimes/shadecomm` <Enter>
- . c) Key-in: `run` <Enter>

d) Type in your name or ID then <Enter>. Use the same ID throughout the Cx tests.

## 9. Select the database

Make sure that the current database is correct. The top line shows the name of the existing database (in the example above, the database is called "Training").

Change the database if you need to change or create a new database. There can be more than one database, such as one for training, another for commissioning, another for post-occupancy evaluations, etc.



- To specify database, key-in Choice "4" <Enter>
- Then key-in database name, e.g. "Training" <Enter>

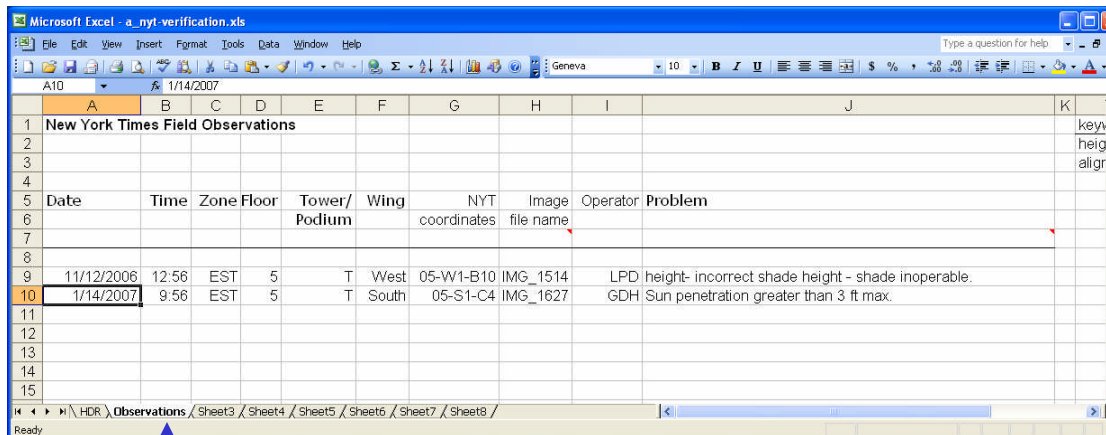


## 10. Check for direct sun control problems

Check to see if direct sun control mode is operating properly.

### a) If it is sunny and you observe improper sun control:

- Look at the depth of sun penetration on the floor.
- Check if the depth of sun penetration is greater than 3 or 6 ft perpendicular from the face of the window glass (depending on the control zone, 3 ft is typically the maximum depth where work stations are close to the window and 6 ft is depth allowed near the stairs).
- If it exceeds the maximum depth, document the failed mode as follows:
- Lay the measuring tape on the floor and take photos of the condition (using the handheld regular camera) showing depth of penetration with tape in photo and photo from greater distance for documentation of shade height.
- Open the verification database (see Step 22), click on the “Observations” worksheet tab, then note your observations as an entry in the database.
- Download the photo from the camera using the “Image Capture” program (icon is on the dock) into the folder “scart/nytimes observations”. Record the image number into the database.



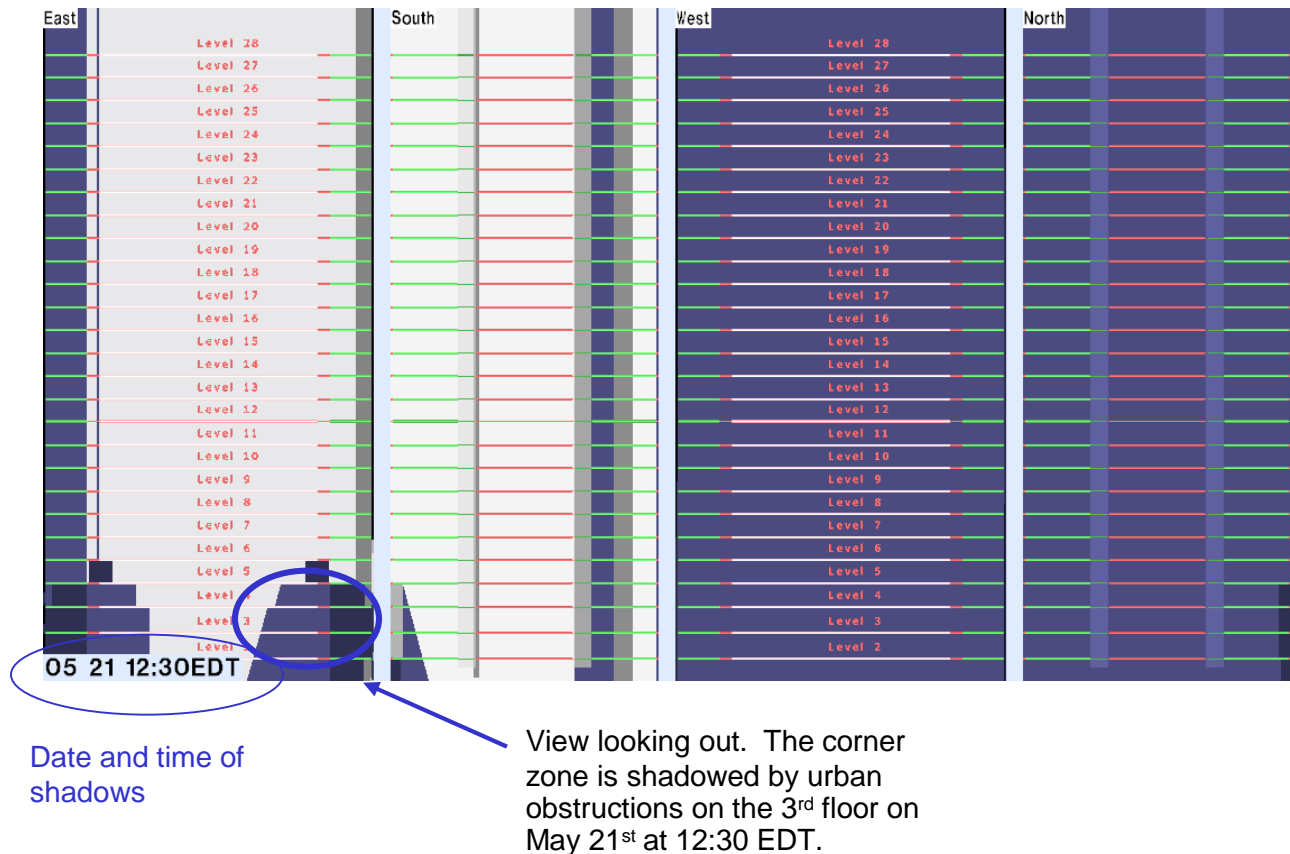
	A	B	C	D	E	F	G	H	I	J	K
1	New York Times Field Observations										
2											keyv
3											heig
4											aligr
5	Date	Time	Zone	Floor	Tower/ Podium	Wing	NYT coordinates	Image file name	Operator	Problem	
6											
7											
8											
9	11/12/2006	12:56	EST	5	T	West	05-W1-B10	IMG_1514	LPD	height- incorrect shade height - shade inoperable.	
10	1/14/2007	9:56	EST	5	T	South	05-S1-C4	IMG_1627	GDH	Sun penetration greater than 3 ft max.	
11											
12											
13											
14											
15											

Click on “Observations” worksheet tab

## 11. Check for direct sun/ urban shadow control problems

b) If it is sunny, check whether the urban shadow mode is working properly:

- Key-in Choice 1: Select date for shadow and sunpath diagrams.
- Key-in Choice 2: View urban shadows.
- The software will take some time to compute and generate images. To save time, specify 21<sup>st</sup> day of the month (closest to actual date) and precalculated images will be loaded immediately.
- Click on image showing the proper time, find the control zone, and determine whether the control zone is entirely in shadow (see Section 3.3.3 of the Cx manual).
- If it is fully in shadow, then the shades should be raised to preset 0 and there should be no direct sun penetration.
- If the shades are lowered, document the failed control mode using the procedures described in step 10 above.

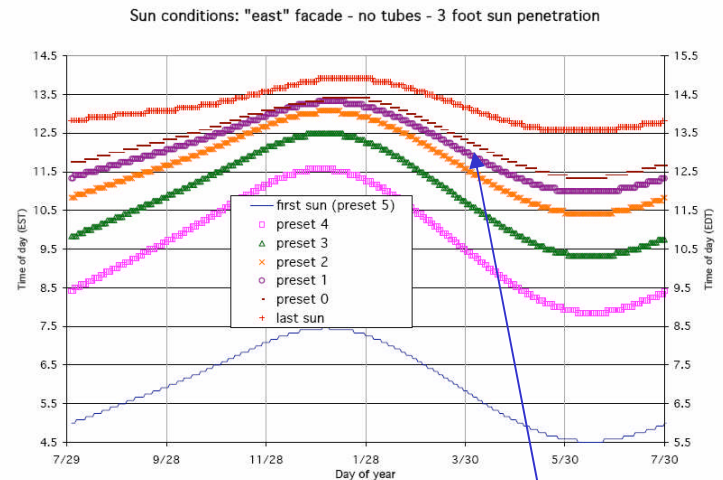
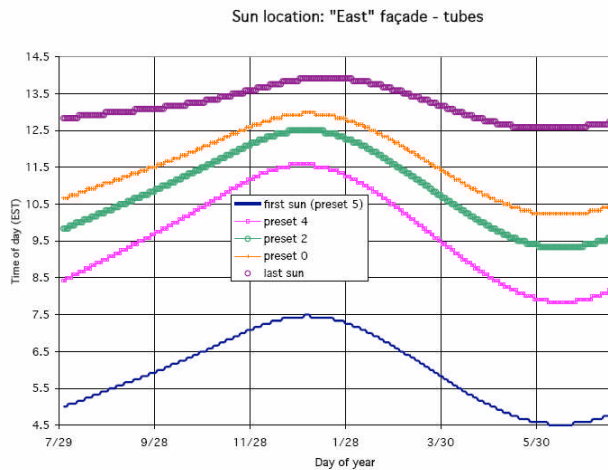


## 12. Check for direct sun/ attached exterior shading control problems and other control problems

c) If it is sunny, check whether the direct sun control mode is accounting for the exterior ceramic tubes:

- Find the correct graph (located in scart/nytimes resources/R1-pdfs) to determine the approximate shade position. The tubes will be shading the façade when the sun has a high altitude and in the plane of the window. Compare for example, the graphs East-tubes.pdf versus East-NT3.pdf (NT=no tubes) and note when presets 1 and 2 are used in the NT case. These are times when you should check the façade with tubes.
- If the shades are lowered but the tubes shade the façade, document this failed control mode using the photo documentation procedures described in step 10 above.

If there are any other problems (shade alignment, improper motor groupings, problems with touch screen user interface), then use the photo documentation procedures described in step 10 above.

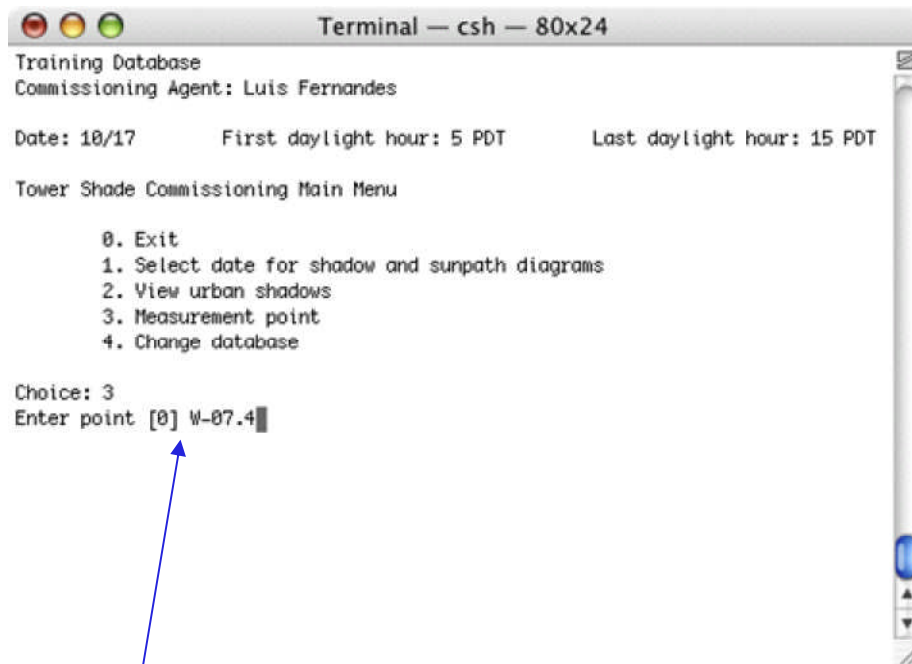


Ceramic tubes shade the east façade on March 30<sup>th</sup> from ~12:00-12:30 EST



### 13. Specify the measurement point to check glare control

Consult the Cx schedule and locate the measurement point location on the NYT furniture plans. The measurement point location refers to the MSS control zone number shown in their shop drawings (3/7/06). If changes are made to the furniture and/or control zones, define a new measurement location using the procedures described in Section 2.1.2 of the main Cx manual.



- To enter measurement point, key-in Choice "3" <Enter>
- Then enter point name, e.g. "W-07.4" <Enter>

To list all existing point names, enter a bogus name then answer "n" to the question "Is this a new measurement point".

## 14. Read measurement point header

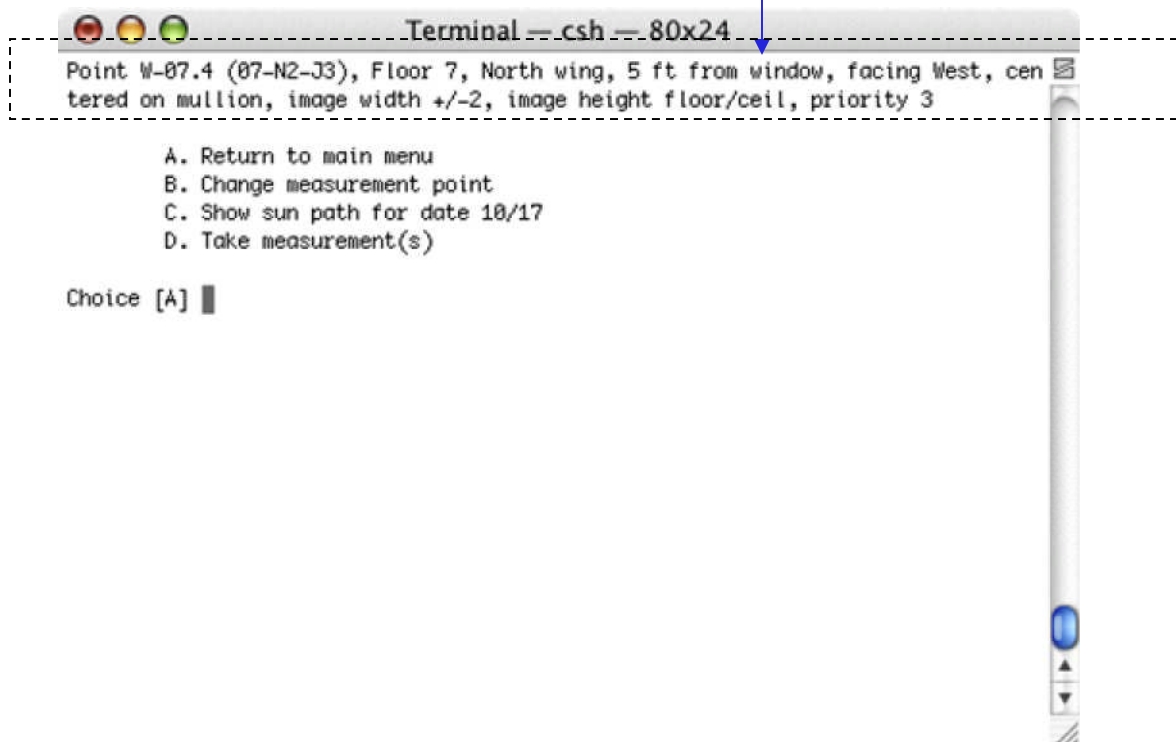
After selecting the point, the software will display information about where to position the camera and what part of the window wall to measure.

Measurement position information includes:

- Point name (e.g. W-07.4)
- NYT coordinate system (e.g., 07-N2-J3)
- Floor (e.g. 7)
- Wing (e.g. North)
- Position and direction of measurement (e.g. 5 ft from window, facing West, centered on mullion)
- Image processing information (e.g. image width +/-2, image height floor/ceil)
- Priority (e.g. 3) where 0=very low and 4= very high.

For details, see Section 2.1.2.5 of the Cx manual.

- Read measurement point header



## 15. Position camera



Remove lens cap and hood



Turn camera on

Place your eyes in the position and direction of measurement, or place the camera instead and look through the view finder. **If you can see the sun directly, the measurement cannot be taken – it will damage the camera.**

When you are ready to take a measurement, the position for the camera is given in the header for the measurement point (see Sections 2.1.2.5 and 3.3.4 in the Cx manual).

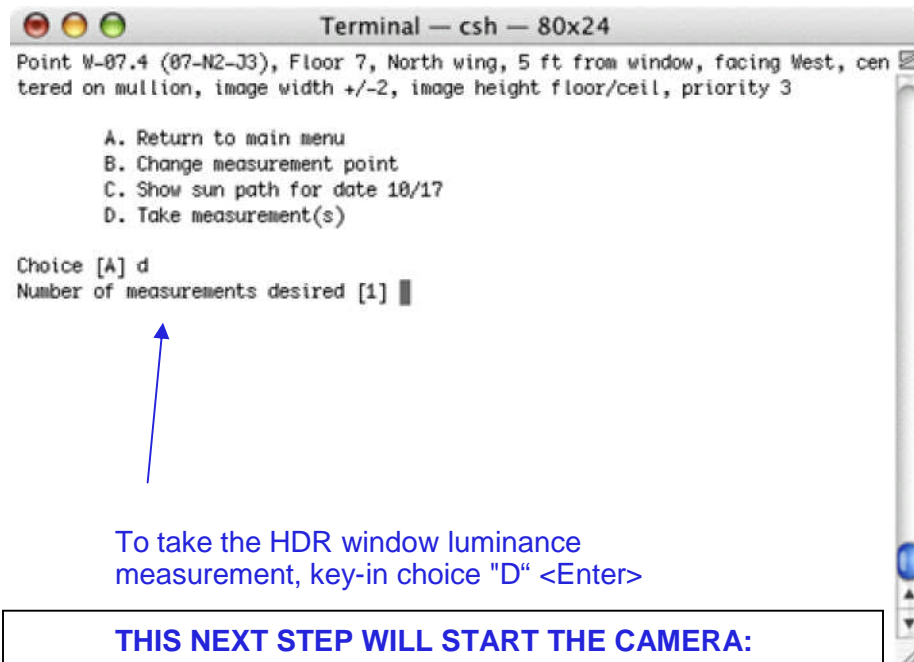
Position the camera accurately once you have determined that

- a) the sun orb is not in the camera's field of view, or
- b) the orb is in the field of view but is completely obstructed by the interior shades.

Use the electronic or regular tape measure to measure the distance( $\pm 0.25$  inches) from the rim of the fisheye lens to the window glass or frame. Keep lens cap on until time of measurement.

Line the camera up so that the lens is centered on the mullion, corner, or on the width of the window glass, according to the measurement information (see previous step).

## 16. Take a window luminance measurement



### THIS NEXT STEP WILL START THE CAMERA:

Press <Enter> to accept default of [1] measurement.

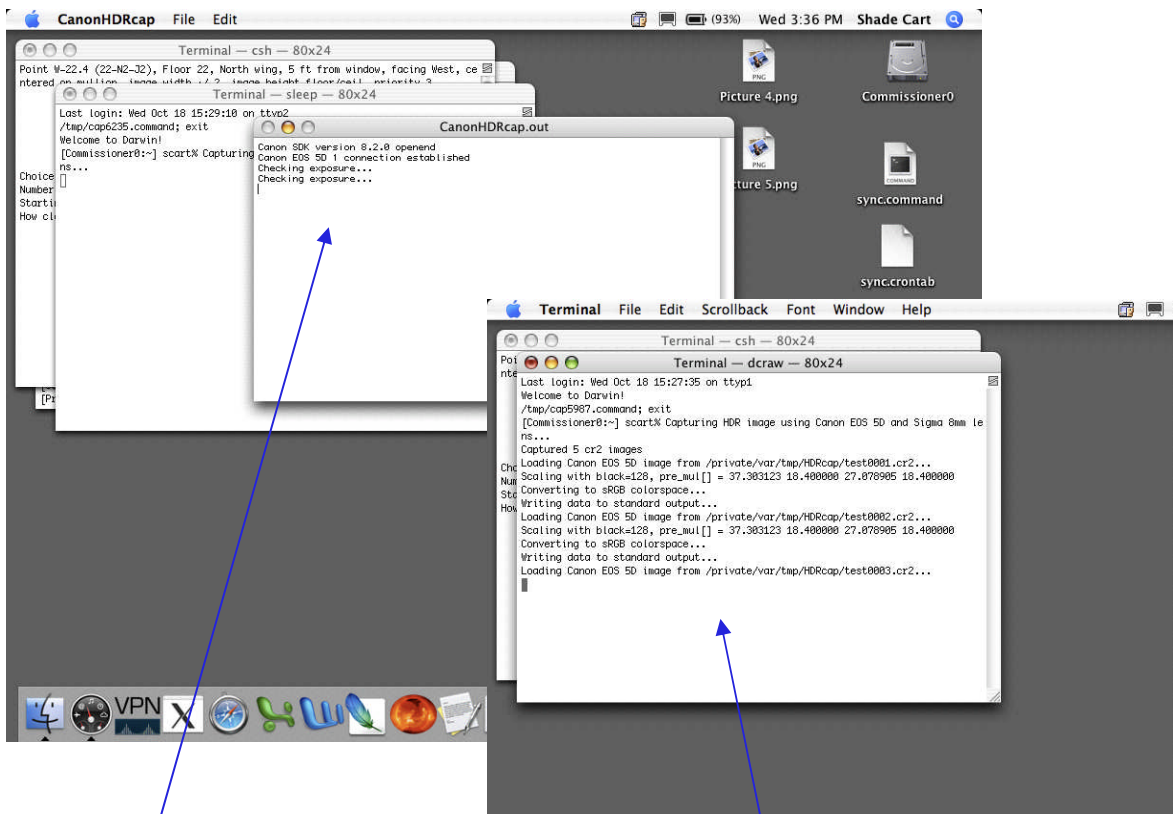
**Camera will immediately start taking 5-8 photos.**

**Do not enter a number other than 1.** If you enter a different number, then abort the program (control-C).

**Do not walk in front of the camera or cause it to move (e.g. by moving the cart, or typing on the computer) when image capture is underway.**

**Complete steps 16-22 as quickly as possible (< 5 minutes).**

## 17. Taking a measurement (continued)



Wait while camera  
takes pictures

Wait for pictures to be  
transferred to computer

If the CanonHdRcap.out window indicates an error (“No camera found!”), then there is a problem with the camera connection and the two new windows will need to be closed manually and the whole process restarted. Turn the camera off, wait a few seconds, then turn it back on, again waiting a few seconds. In the Terminal window, abort the HDR software using the ctrl-C command or click on the red “close” button on the title bar.

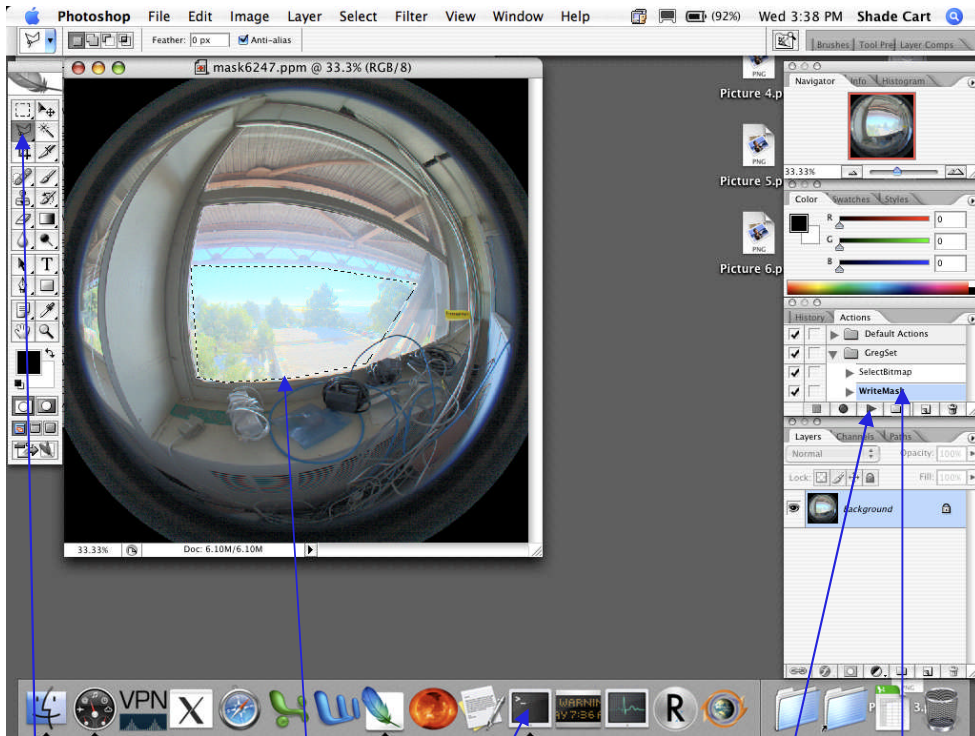
## 18. Taking a measurement (continued)



Replace lens cap and hood



Turn camera off



1. Select lasso tool

2. Outline the appropriate window area according to measurement position info

2b. Click on Terminal icon if you need to check measurement position info

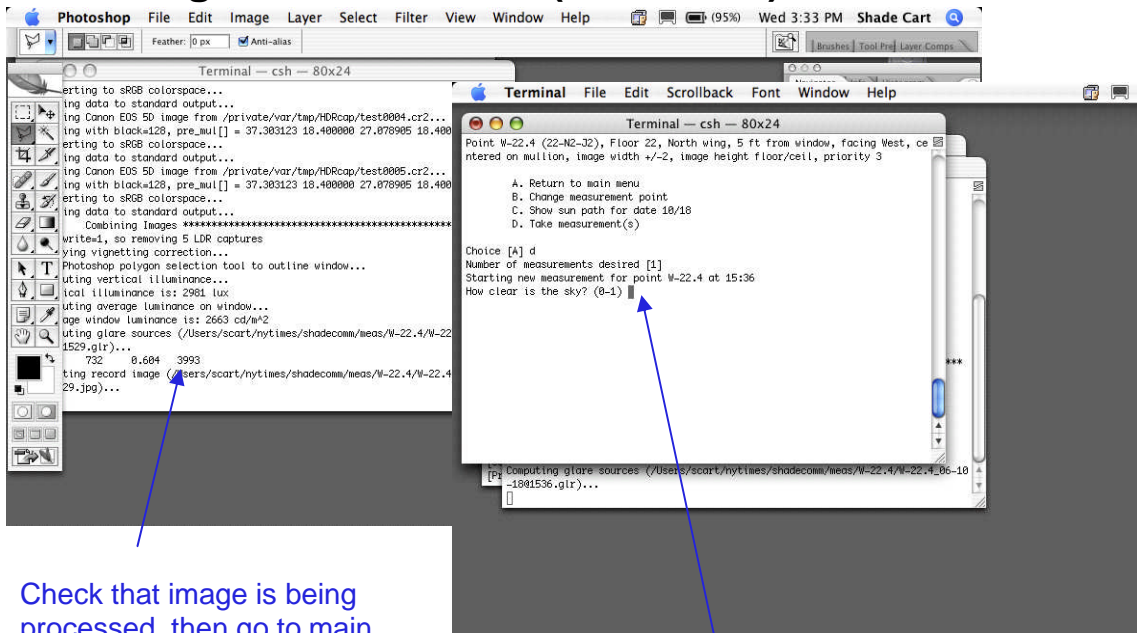
3. Select WriteMask action

4. Click on "Play" button

When outlining the window, more than one area can be selected by also holding down the Shift key. Use the escape key to retrace the mask. To abort the outline, click on any new location on the photo. To close a lasso loop, position the cursor close to the start point and key-in <Enter>.

If the "Actions" pane isn't already open, it can be selected from the "View" menu.

## 19. Taking a measurement (continued)



Check that image is being processed, then go to main program Terminal window

While image is being processed, you can start answering these questions

**How clear is the sky? (0-1)** Describes overall sky condition viewed from measurement point. Value entered should be scaled according to below:

0	Completely overcast
0.25	Some blue patches
0.50	Partly cloudy
0.75	A few clouds
1	Nothing but sky

**Is the sun in the field of view? (y/n)** If sun is visible from measurement point through the lowered shades, value should be "y", otherwise "n". Do not take a measurement if entire orb of the sun is not obstructed by the shade, the building, urban obstructions, or by heavy clouds.

**Are the shades on manual override? [n]** Enter y if yes. Enter n, if no (default=automatic mode).

**What is the shade preset height? (0-5)**

- 0 = fully retracted
- 1 = half way between the fully retracted position and the top of the vision window
- 2 = top of the vision window
- 3 = 4 feet above finished floor
- 4 = bottom of vision window
- 5 = down to the floor

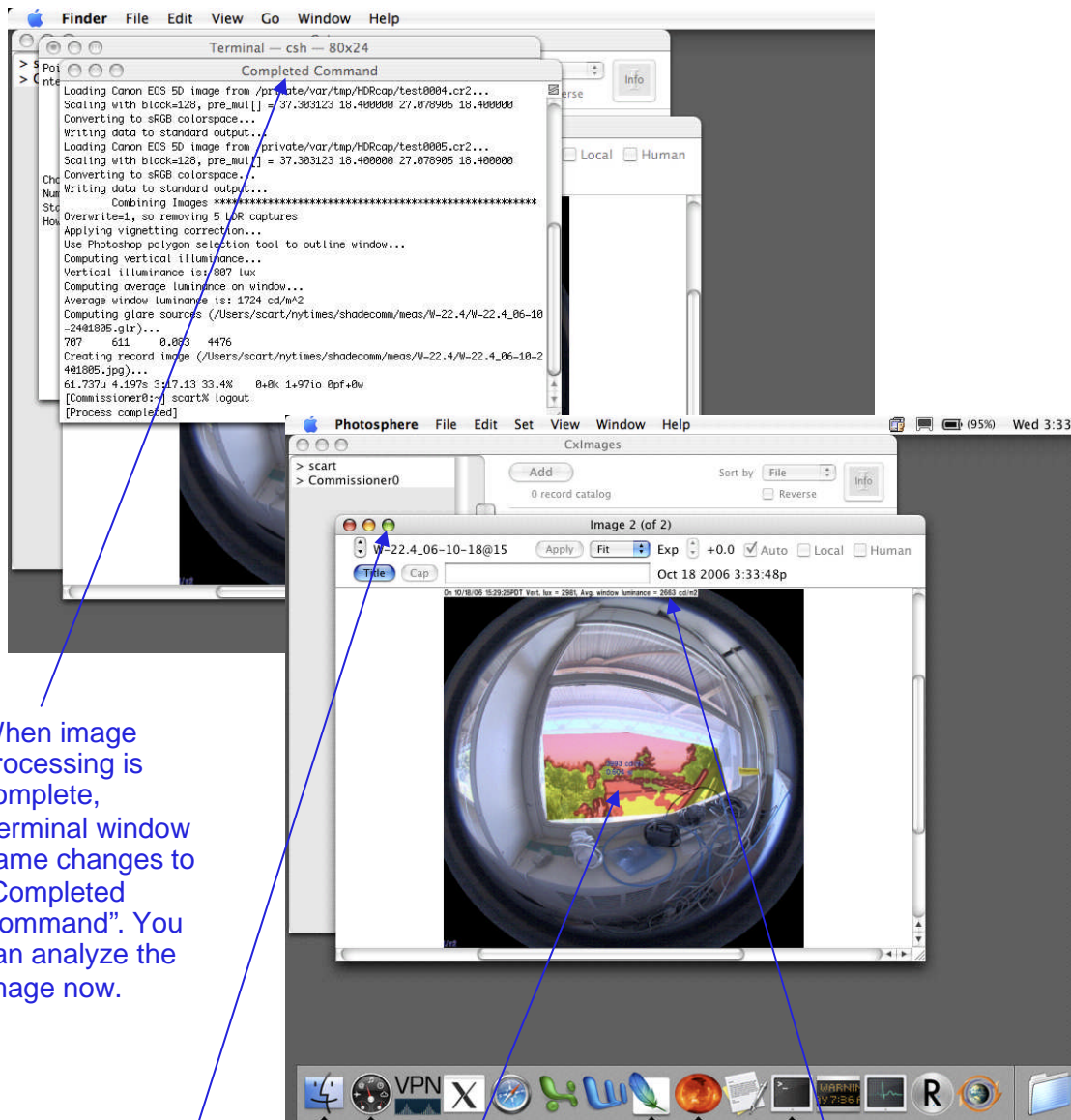
**Subjective rating of discomfort glare? (0-100).** If your eye were positioned in the same location as the measurement, how would you rate your level of visual discomfort?

- 0 = no glare
- 25 = perceptible glare
- 50 = noticeable glare
- 75 = disturbing glare
- 100 = intolerable glare

**Additional comment?** Indicate, in one line, any noteworthy condition (e.g. reflected sunlight off opposing building, pattern of sunlight on work surfaces, etc.). This field could also be left blank. **Don't finish entering this comment just yet.**



## 20. Taking a measurement (continued)



When image processing is complete, Terminal window name changes to "Completed Command". You can analyze the image now.

If necessary, click on green button to enlarge window

1. Study glare sources (highlighted in pink)

2. If **average window luminance,  $L_w$** , is close to 2000  $\text{cd/m}^2$ , then enter comments about glare in the Terminal window

Compare the glare sources highlighted in pink to the actual view and note possible reasons for glare.

**Quickly step through pass/fail logic on the following page before moving the camera.**



## 21. Assess the glare control mode (long version)

Using the average window luminance value,  $L_w$ , from the previous step, apply the following logic to determine what to do next:

### a) When in the automatic mode:

- If the shade is up (fully retracted or shade preset height 0), then it is in the daylight mode. The shade control zone passes if the average window luminance is below  $2200 \text{ cd/m}^2$ , and fails if it is above  $2200 \text{ cd/m}^2$ .
- If it passes, make your final comments and save the measurement, then go to the next measurement point and repeat steps 13-21.
- If it fails, make your final comments and save the measurement, then go to the next measurement point and repeat steps 13-21.
- If the shade is down (covering any portion of the window wall or shade preset heights 1-5), then the shade is in the direct sun and/or glare control mode. The shade control zone passes if the window luminance is below  $2200 \text{ cd/m}^2$  and fails if it is above  $2200 \text{ cd/m}^2$ .
- If it passes, make your final comments and save the measurement, then go to step (b) below.
- If it fails, make your final comments and save the measurements. The shade is failing because the fabric is not dense enough. Go to the next measurement point and repeat steps 13-21.

### b) If the shade passes in the automatic mode, then test the system in the manual mode:

If sunny, check if the shade control zone is in the direct sun control mode by raising the shade(s) to preset 2 and measuring the horizontal depth of sun penetration. If the depth exceeds the maximum allowable distance and passes in the automatic mode, then the shade control system passes.

If the depth of sun penetration does not exceed the maximum allowable distance or if not sunny, then check if the glare mode is too restrictive with the shade(s) at preset 2 (façade with or without tubes):

- Make your final comments and save the measurement for the automatic mode.
- Raise the shade to preset 2 using the touch screen user interface.
- Repeat steps 16-21 to take a 2<sup>nd</sup> window luminance measurement, keeping the same camera position. Do not take a measurement if the sun is in the field of view of the camera (even if the sun is slightly obscured by tubes).
- The shade control zone passes if the average window luminance is above  $1800 \text{ cd/m}^2$  and fails if it is below  $1800 \text{ cd/m}^2$ .
- **Note: The pass/fail status is determined automatically in the verification software.**

## 21. Assess the glare control mode (short version)

Using the average window luminance value,  $L_w$ , from the previous step, apply the following logic to determine what to do next:

### a) When in the automatic mode:

If the shade is up (shade preset 0), then:

- If  $L_w > 2200 \text{ cd/m}^2$ , system fails.
- If  $L_w < 2200 \text{ cd/m}^2$ , system passes.
- For either case, make your final comments and save the measurement, then go to the next measurement point and repeat steps 13-21.

If the shade is down (shade preset heights 1-5), then:

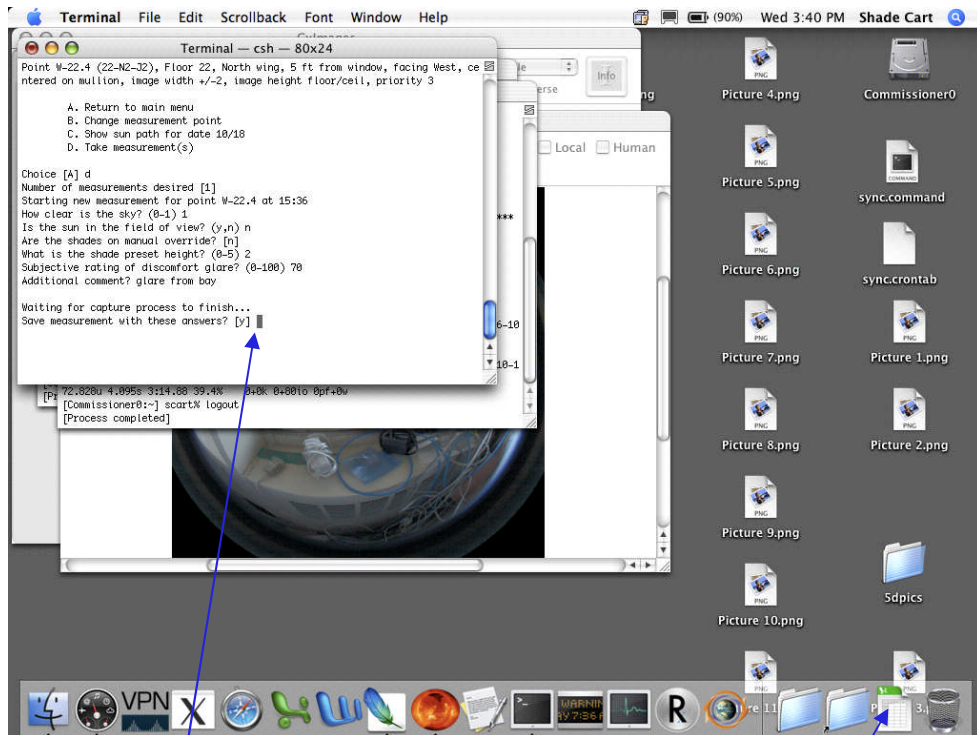
- If  $L_w > 2200 \text{ cd/m}^2$ , system fails because the fabric is not dense enough.
- Make your final comments and save the measurements. Go to the next measurement point and repeat steps 13-21.
- If  $L_w < 2200 \text{ cd/m}^2$ , system passes.
- Make your final comments and save the measurement, then go to step (b) below.

### b) If the shade passes in the automatic mode, then test the system in the manual mode:

- If sunny, raise shade to preset 2 using the touch screen user interface, then measure sun depth (d).
- If  $d > \text{max}$ , then system passes. Make your final comments and save the measurements. Go to the next measurement point and repeat steps 13-21.
- If  $d < \text{max}$  or if not sunny, then:
  - Make your final comments and save the measurement for the automatic mode.
  - Raise the shade to preset 2 using the touch screen user interface.
  - Repeat steps 16-21 to take a 2nd window luminance measurement, keeping the same camera position. Do not take a measurement if the sun is in the field of view of the camera (even if the sun is slightly obscured by tubes).
  - If  $L_w > 1800 \text{ cd/m}^2$ , system passes.
  - If  $L_w < 1800 \text{ cd/m}^2$ , system fails.
  - Make your final comments and save the measurements. Go to the next measurement point and repeat steps 13-21.

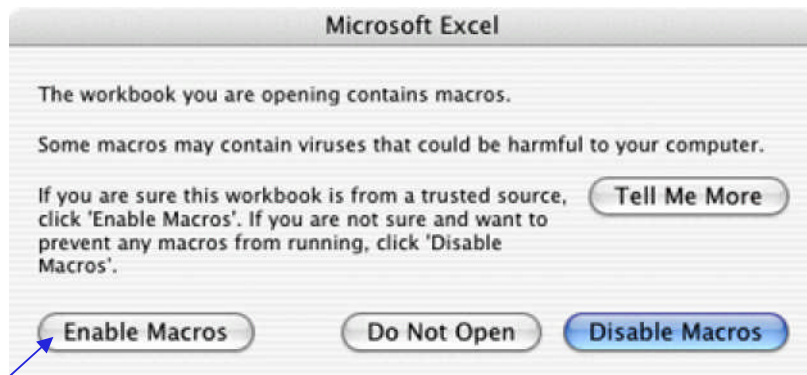
**Note: The pass/fail status is determined automatically in the verification software.**

## 22. Open the verification database



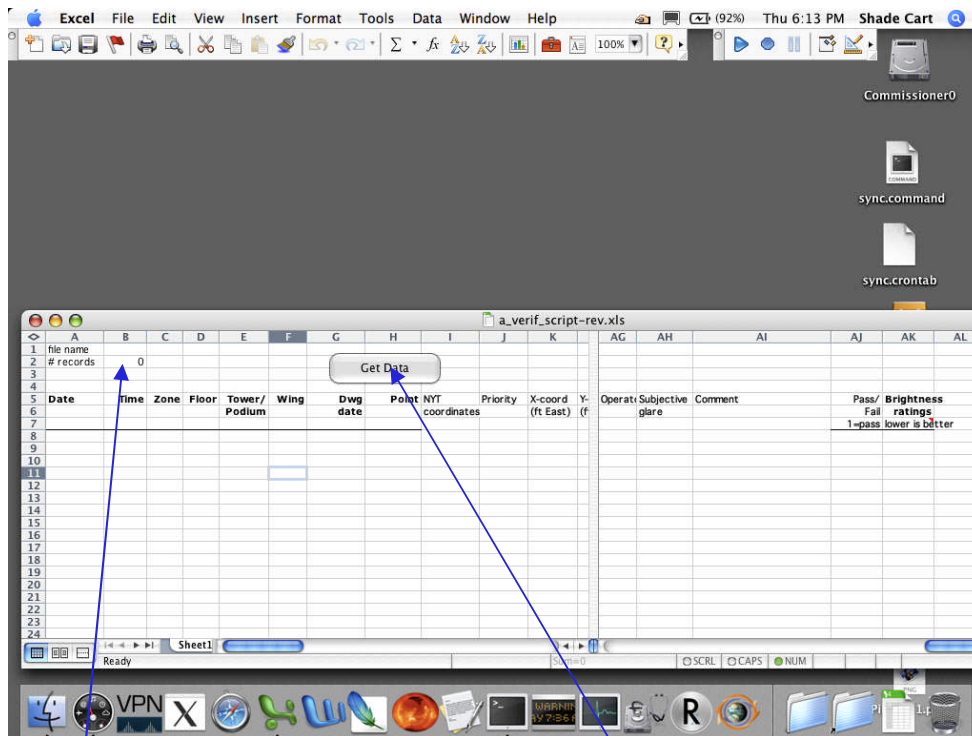
**After entering comments, save measurement**

To check data either during the measurement process or when measurements are done, [click here](#) to open the verification database.



[Click here to enable macros.](#)

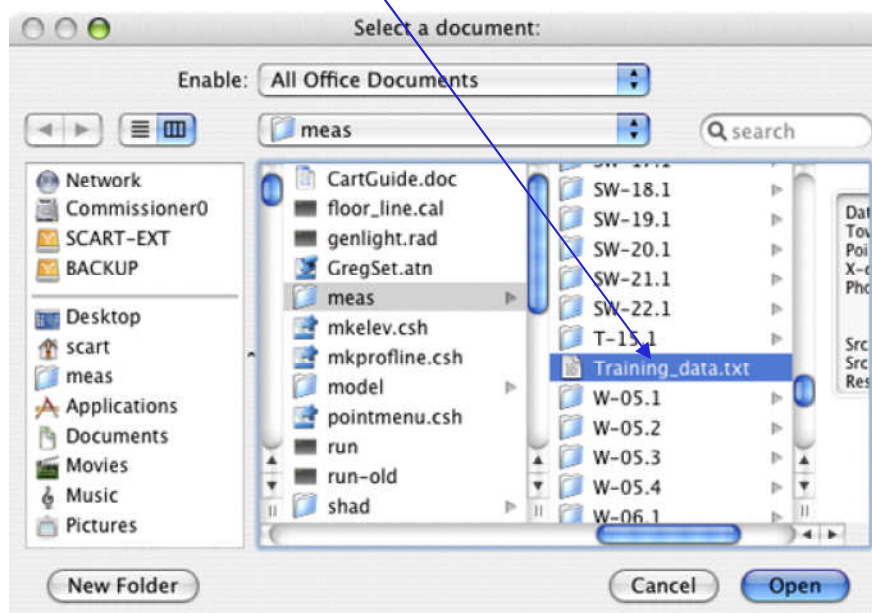
## 23. Update the verification database



If this is the first time you are using this database, delete cell B1 and enter "0" (zero) in cell B2

Click here to load data. (Note: this gets data from the ASCII text files generated during the measurement process.)

If this is the first time you use this database, select it within the "meas" folder, then click on the "Open" button.



## 24. Check the verification database

	A	B	C	D	E	F	G	H	I	J	K	AG	AH	AI	AJ	AK	AL	AM	AN
1	file name	Commissioner0\Users\wardnytimes\radf\shade\commmeas\Trainino_data.txt																	
2	# records	4																	
3																			
4																			
5	Date	Time	Zone	Floor	Tower/ Podium	Wing	Dwg date	Point NYT coordinates	Priority	X-coord (ft East)	Y-coord (ft North)	Operat	Subjective glare	Comment	Pass/ Fail	Brightness ratings			
8	10/11/06	11:41 PDT	22 T	West	3/17/06 G-NW-22.1	22-W1-A7	1	5	1	5	5	gw	0	indoors	0	0.81584			
9	10/11/06	12:55 PDT	22 T	West	3/17/06 G-NW-22.1	22-W1-A7	1	5	1	5	5	gw	90	LBNL cubicle near south win	0	1.45942			
10	10/18/06	15:29 PDT	22 T	North	3/17/06 G-W-22.4	22-N2-J2	3	53	3	53	53	Luis Fer	70	glare from bay	0	2.28189			
11	10/18/06	15:36 PDT	22 T	North	3/17/06 G-W-22.4	22-N2-J2	3	53	3	53	53	Luis Fer	70	glare from bay	0	2.28426			

Find your measurement in the database.

Check column AJ for pass (white) or fail (orange)

If measurement passes, check column AK: orange is warning flag for glare

All header information related to the measurement point is located in columns A-Q. HDR data are given in columns R- AB. User input information are given in columns AC-AI. The pass/fail result which is computed automatically based on criteria given in Section 1.4 of the Cx manual is shown in column AJ. A subjective brightness estimate is computed automatically in column AK.

You can add additional fields after column AK that will not be overwritten by the Excel macros. Original values in columns A-AK can be modified but this is not advised.

If points are superseded because of furniture or other space changes, then follow the instructions in Section 2.1.2.3 and 3.5.1 to archive old images and tag data in the verification database as superseded.

## 25. Wrap up

Perform measurements for all points on floor per the measurement schedule.

When all points are done for a floor, review database and check for fails. Alert the manufacturer of any problems and provide substantiating data. If time, check the manufacturer's computer to determine source of error in collaboration with the manufacturer.

Store shade cart in secure location. Put away all computer and camera equipment. Recharge all batteries.

Synchronize the cart computer with the LBNL computer each day data are collected.

Synchronize/ save the data to the hard disk for backup each day data are collected.

If there are changes to HDR software, MSS control software, protocol, etc., note date and time changes were made in the experimental log (MS Word file located on the dock).